

tinuous shortening of the latent period ; (*b*) a gradual and distinct increase in the height of the curve ; and (*c*) a more rapid arrival at the summit, followed by a sudden fall of the lever, which usually passes considerably below the abscissa. Extreme warmth has, however, an opposite effect when above 90° F. : the altitude gets lower and the muscles remain contracted.

4. Cooling causes : (*a*) the latent period to rapidly increase ; (*b*) a great increase in the duration of the contraction ; (*c*) at first a slight elevation in the altitude (extreme cold, however, lowers it) ; (*d*) the initial part of the curve is flattened, and the summit is delayed until a later period.

5. Gentle activity seems to increase the rate and power of contraction. Very weak interrupted currents have an effect like that produced by gentle heat. If extreme fatigue be induced : (*a*) the latent period becomes much longer ; (*b*) the duration of the contraction is increased ; (*c*) the height of the curve is considerably lessened ; and (*d*) its summit is moved away from the beginning of the contraction toward the end of the curve.—*Foster's Journal of Physiology*, vol. iv, Nos. 2 and 3.

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THE SPINAL CORD AND CEREBRAL CENTRES.—Prof. Schiff has lately made a series of studies upon the nervous system. His results are as follow :

The posterior columns at the lower part of the spinal cord are sensitive, and irritation causes pain. The sensibility is greater at their outer edge than in the middle line. In the cervical segment it is otherwise ; there irritation causes no pain, and generally no marked sensitiveness. He concludes that the longitudinal fibres of the posterior columns (independent of the regions where the nerve-roots are), by weak irritation, can cause an increase of sensitiveness, but not to the degree of pain. The posterior columns contain no motor fibres. The anterior columns are not irritable to organic irritations. A segment of the spinal cord which is robbed of its posterior columns conducts pain and pressure-sensations, but no tactile sensations. He does not believe that the use of pressure in a mercurial manometer is a measure of pain. The irritation of a nerve sets into activity vaso-constrictor and vasodilator centres, and by the overpowering action of the former centres the mercury rises. To the bladder and colon the spinal cord gives reflex movements, but no motor-conducting paths, but only kinesodic paths of conduction. There are irritable centripetal nerves which cause no consciousness of a sensation, which run only to the medulla oblongata, and are lost here in the reflex apparatuses. These centripetal nerves cause, when irritated, elevation of blood-pressure. To seek centres, the only method is by that of paralysis, for all centres are inexcitable to artificial irritants. He has found that the extirpation of Hitzig's and Ferrier's cortex centres neither paralyzes these muscles nor weakens them. There is only a modification in the position of the member, which

coincides with those seen after section of the posterior columns. They are explained by want of tactile sensibility. If these centres are extirpated more deeply, then there is a want of all sensibility. The peculiarities seen after extirpation of the centres are due to want of tactile sensibility, for the tactile sensations of the different organs have cerebral centres, which are yet active when all peripheral-entering nerves of tactile conductivity are paralyzed. The centre of vision is active when both of the nerves are paralyzed, through substitution-action with other centres. The degeneration of the pyramido-lateral paths is due to affections of motor centres. The view of motor centres is superfluous; the movements are reflex.

His supposition is: that the posterior columns and Türck's columns are mainly of the same system; the pyramido-lateral paths are not otherwise than the descending angle of a reflex arc, through which the position of our limbs or changes in our equilibrium are regulated. After division of Türck's columns the movements do not take place after irritation of Hitzig's centres. The position of the tactile centre is not in the cortex. In the spinal ganglia lie the trophic centres for the ascending line of the cerebral tactile arc.—*Pflüger's Archiv*, xxviii, 1882; xxix, 1882; xxx, 1883.

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THE IRRITABILITY OF THE ANTERIOR COLUMNS OF THE SPINAL CORD.—Herr Mendelssohn has made experiments upon this subject in the laboratories of Marey at Paris and Rosenthal at Erlangen. He used a myograph to register the contraction of the muscle. His method of experimenting was as follows: The cerebrum was divided in order to exclude voluntary movements, the gastrocnemius of the left side prepared, the spinal cord in its whole length laid bare, the brachial plexus on both sides divided, the spinal cord lifted out of the vertebral canal, and its anterior part placed on plates of rubber. Then the gastrocnemius was attached to the lever, and the electrodes laid on the anterior part of the spinal cord, near the place where the brachial plexus is given off. The distance of this place from the roots of the nerves for the lower extremities is so far that a possibility of the spreading of the currents to the posterior roots is lessened and excluded. To test the spreading of the currents he used the telephone, which is preferable to the nerve-muscle preparation for the detection of weak currents. From all his experiments he found that the reaction of the anterior columns is shorter than the reaction-time of the posterior columns of the spinal cord; that is, irritation of the anterior segment of the spinal cord generates a movement of the extremities quicker than when the same irritation acts on the corresponding place of the posterior part. The movement generated from the posterior columns is a reflex movement, whilst that generated in the anterior columns is a direct excitation. The difference between the times of reaction was from .01 to .025